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Journal of the Society of Arts.

FRIDAY, OCTOBER 28, 1859.

ARTISTIC COPYRIGHT.

The attention of the Council will be again directed to this subject in the early part of the ensuing Session, and a meeting of the Artistic Copyright Committee will shortly be called, in order to consider what further steps should be taken in furtherance of the objects proposed by the Council.

PRIZE FOR AN ESSAY ON MARINE ALGÆ.

A Prize of £100 has been placed at the disposal of the Council, by Sir W. C. Trevelyan, Bart., to be awarded for "The best Essay on the Applications of the Marine Algæ and their products, as food or medicine for man and domestic animals, or for dyeing and other manufacturing purposes. Competitors must give the results of their original investigations on seaweeds; and they must prepare a series of specimens illustrative of the best modes of collecting, preserving, and preparing the several species. Mere compilations will not be admitted to competition."

The Essays, with accompanying specimens, must be sent to the Society of Arts by the 31st day of December, 1860. Each Essay to be marked "Essay on Marine Algæ," and to have a motto or distinctive mark attached, which mark must also be written on a sealed letter, containing the name and address of the author.

The letters containing the names and addresses of the authors will remain with the Society of Arts, and none will be opened except that bearing the motto or mark attached to the Essay to which the adjudicators award the Prize.

Copies of the conditions may be obtained on application to the Secretary of the Society of Arts.

THE LATE ISAMBARD K. BRUNEL.

The following notice has been contributed by a member of the Society:—

The death, at a comparatively early age, of so distinguished a member of our Society, and of one whose life was devoted to the advancement of works calculated to promote and to extend the advantages to be derived from Arts, Manufactures, and Commerce, requires notice from us.

Mr. Brunel inherited a great name from his father, but he has left that name to his son still greater.

Sir Isambard Brunel, known more by his great mechanical than engineering works, wanted those elements of character required to achieve national greatness which were so pre-eminent in his son. Promptness and boldness, controlled by the greatest caution; the power of enlisting the support of individuals and public bodies by his wonderful facility and accuracy of illustration, and the calm and comprehensive view of every principle he desired to establish in the minds of others—united with great earnestness of purpose, a strict love of truth and an abnegation of self, gave together unlimited confidence in his opinions and judgment.

In a hasty review of his works—and that is all we can give in a notice of this kind—we shall not fail to observe how these elements of his character were exhibited, as well in his early as in his later designs. The proposed Clifton-bridge was the first undertaking to which he was appointed engineer, and this he owed to the fact that upon the reference of the competing designs to two distinguished mathematicians for the verification of the calculations, his alone were pronounced to be mathematically exact.

This introduction to Bristol, where he soon made influential friends, led to his appointment as engineer to the Great Western Railway; and, whatever may be the opinion of the merits of the broad-guage, we find in his plans for this railway that largeness of view which never forsook him. Here he boldly laid down the principle, that if it were expedient to incur the expense of a railway, the more perfect the construction of every part the greater would be the ultimate success. He maintained, before two successive parliamentary committees, through personal examinations of unparalleled duration, that railways ought to be made so perfect as to attain the highest speed consistent with safety. To accomplish this, he widened the guage, enlarged the engines, supporting them and the carriages on six or eight wheels, instead of four; and spared neither labour nor expense to produce a line which should combine the maximum speed with the minimum risk, and with the greatest comfort to passengers. Upon these points no line yet constructed, taking advantage of every recent improvement, has surpassed the Great Western as finished by Mr. Brunel.

The personal labour—mental and physical—attending the construction of this railway will be thoroughly understood by our readers, when they recollect that every part of it had to be specially designed; the form of rail incidental to the adoption of the principle of continuous bearing; the construction of engines of a size and power then unknown; the erection of bridges, viaducts, and embankments, with reference to the greater loads and higher speeds proposed for this line, every part was novel, and was designed and drawn by himself.

While this railway was in progress, two or three other interesting works occupied his attention, among them were the Hungerford Suspension Bridge (the centre opening of which was the largest span then achieved, and is still the largest in England), the Sunderland Docks, and the *Great Western* steamship. This, we may say, was the pioneer to the *Great Eastern*, and was in size and power so far beyond anything then built as to excite ridicule among the ignorant, and surprise among the more thoughtful and intelligent observers. This ship was designed with a view to increase the rapidity of communication between England and America, in about the same proportion that Mr. Brunel calculated the *Great Eastern* will increase that between this country and India and Australia.

But to return to Mr. Brunel's railway engagements, which, notwithstanding the opposition to the broad-guage, extended throughout the West of England, to Penzance in one direction, and to Milford Haven in the other.

In the construction of this series of lines from London to either terminus, his high engineering talent had ample opportunity of development.

The viaduct at Hanwell, the Maidenhead bridge, the bridge over the Thames at Windsor, the Box tunnel, were in their day striking illustrations of the perfect knowledge he possessed of the strength of materials;

his skill in combining them so as to secure in the highest degree the advantages of all; and the accuracy and soundness of the calculations upon which he based the erection of structures which others thought decidedly insufficient for their purpose. Further down these lines we arrive at the Chepstow and Tamar bridges, perhaps the finest specimens of his original and fertile genius. Indeed, the entire line from the Tamar bridge to Penzance exhibits wonderful boldness in design, and lightness and originality of construction; but we cannot now dwell longer on these lines, and must only give a passing notice to his works in Lombardy, to his designs for railways in Australia, and to the very useful services he rendered to the Government during the Crimean war, by superintending the construction of the Renkoi hospitals.

It is impossible, in a brief paper of this kind, to notice nearly all the works of so great a man as Mr. Brunel, whose entire time, almost day and night, for 30 years was devoted to the active pursuit of his profession, but we must not omit a brief reference to the *Great Eastern* ship, which occupied for many years a very considerable amount of thought, involving a careful collection of every fact relating to ocean steam navigation, which tended to show why, to this time, ocean steam navigation had been a failure.

One distinguishing feature of his original mind was a strong conviction that mechanical invention, and the science of engineering, should not be confined in its application to special localities, but that its greatest triumphs were to be sought for and found in overcoming, if possible, the physical difficulties which check the most perfect intercourse between distant nations.

He began with America,—and what subject could more worthily employ the mind of a great man than the consideration of the means whereby the intercourse between England and America, the most civilized and enterprising nations in the world, could be so facilitated as to bring them with regularity and certainty within a few days of one another.

No sooner was the power of the *Great Western* steamer an established fact, than public companies, private shipowners, and at last the government, vied with each other in building ships to surpass her. But here again Mr. Brunel made another step in advance, and the *Great Britain*, an iron ship, was designed and built. This ship, of 3,600 tons burthen, was as much larger than any existing ship as the *Great Western* had been in her day, but several important novelties in her construction exposed him to the brunt of ignorant criticism and prognostications of failure.

The *Great Britain*, however, triumphed over all her difficulties, and was a perfect success in an engineering point of view, and is now running between this country and Australia, as one of several ships of equal burthen.

The reputation obtained by these ships led to his appointment as engineer to two ocean steam navigation companies, the Australian Steam Navigation Company at the end of 1851, and the Eastern Steam in 1852.

He advised the directors of the Australian Company, in 1851, to build ships of 5,000 tons burthen, to run the entire distance from England to Australia without stopping for fuel. This advice was not adopted; small ships were built, and failure was the result; but he was more fortunate in his association with the Directors of the Eastern Steam Navigation Company, who, having replied favourably to his inquiry whether, if he could satisfy them that he could build a steam-ship to carry cargo at the rate obtained by clipper ships, could deliver such cargo at Calcutta in 30 or 34 days, could provide ample accommodation for first-class passengers, and carry fuel for her voyage out and home, they would support such an enterprise—he at once produced his plans for the great ship now exciting so much attention.

The history of this ship is brief; every leading principle as to size, form, construction, and motive-power, was decided before he published his views to the directors of the Great Eastern Company.

The writer saw the plans, and had the advantage of hearing the reasons for the adoption of the size, form, and motive-power explained, early in 1851, and we may briefly state them thus:—

1. As to Size and Cost.—These were fixed after most careful consideration of the space required for coals, for a sufficient number of first-class passengers and tons of cargo, to be profitably carried at a rate as low as that then paid to clipper ships.

2. As to Form and Power.—The duration of the voyage being determined, such form and power was adopted as would, consistently with other necessary conditions, accomplish the object in view.

3. As to Strength and Construction.—Here it was necessary first to satisfy the scientific world, and then the public, that a ship nearly double the length, and six times the burthen of any existing ship, was not only as safe, but safer, than any other yet built.

These results were attained as to strength, by the cellular structure of hull and deck, never before adopted in ship-building, and by the combination of a perfect system of transverse and longitudinal bulk heads—as to form and power, by the hollow bow and the beautiful run aft, which all have so much admired, and by the novel application of the joint action of the paddle and the screw; and as to size and cost we can safely say that, notwithstanding the disadvantages arising from the failure in the contract for building this ship, so that to a great extent up to the launch it was finished under most unfavourable circumstances by the directors themselves, still its cost will not preclude the attainment of everything originally contemplated, for even if it be £200,000 more than the estimate, mainly owing to the unfortunate circumstance above alluded to, still, trade and the demand for rapid communication with the East and Australia has increased in a greater proportion since this ship was projected, and this increased demand for the advantages offered by such a ship, by commerce and the government, will more than compensate for the extra cost, though it is difficult to estimate the value of the loss to the company in the completion of the ship, of the advice and knowledge of their late engineer.

We have so far noticed Mr. Brunel only as an engineer, whose last great work is calculated to do more for civilisation, manufactures, and commerce than even the railway system of England; for who can imagine the great results to arise from bringing India, by a route independent of all nations, within 30 days of our shores? and may we not ask, if this ship can do so much, will not more be done by others? If this does 15 knots an hour, at the working cost of a clipper ship, may not 25 knots an hour be done at a cost equal to that of our present overland route; and what mind can then grasp the importance, commercially and politically, of bringing the commerce of India and Australia within 20 or 23 days of England?

We have but little space left to touch upon Mr. Brunel's character as an artist and patron of Art. His early drawings and his later professional designs, prove his high feeling for the purest styles of art; but his Shakesperian pictures, the result of a commission given to twelve of our first English artists, and which produced, among other beautiful paintings, the finest picture of modern times (Sir Edwin Landseer's Midsummer Night's Dream), must place him high among our patrons of Art, quite independently of his otherwise beautiful collection of paintings and articles of vertu.

A few words upon his private character, and we must conclude. By those who knew Mr. Brunel he was beloved. In youth a more joyous, kind-hearted companion never existed. As a man, always over-worked, he was ever ready by advice, and not unfrequently to a large extent by his purse, to aid either professional or private friends. His habitual caution and reserve made many think him cold and worldly, but by those who saw his exterior only could such an opinion be entertained.

His carelessness of contemporary public opinion, and his self-reliance on his own character and on that of his works, were carried to a fault. He was never known to court applause. Bold and vigorous professionally, he was modest and retiring in private life; and sad indeed is it to think that he is carried away in early life (in his fifty-fourth year), when that work upon the results of which, not to this country only, but to the world, he attached the highest importance, is on the eve of successful completion.

BRITISH ASSOCIATION, ABERDEEN, 1859.

The following paper was read in the Mechanical Section:

SOME EXPERIMENTAL RESEARCHES TO DETERMINE THE DENSITY OF STEAM AT ALL TEMPERATURES.—BY WILLIAM FAIRBAIRN, F.R.S., AND THOMAS TATE, F.R.A.S.

I propose to give a short sketch of an apparatus, and the results of the earlier experiments which, in conjunction with my friend Mr. Thomas Tate, I have been investigating by direct experiments, with the intention of determining the law of the density of steam and other condensable vapours; and thus to solve a hitherto almost untouched problem by an experimental method, which will verify or correct the theoretical speculations in regard to the relation between the specific volume and temperature of steam and other vapours. The experiments are being conducted, it is believed, upon an entirely novel and original principle, and one which is applicable at any temperature and pressure capable of being sustained by glass vessels.

For a perfect gas, the law which regulates the relation between temperature and volume is known as Gay-Lussac's or Dalton's law, and is expressed by the equation:

$$\frac{V \times P}{V_1 \times P_1} = \frac{458 + t_1}{458 + t} \quad \ldots\ldots\ldots \text{(1.)}$$

Now, the density of steam has been determined with accuracy by direct experiment at the temperature of 212°, —and at that temperature only,—by the method of Dumas. At 212° Fahrenheit, its density is such that its volume is 1,670 times that of the water which produced it. Hence assuming Dalton's law to hold true for steam, and substituting these values of volume, temperature, and pressure, we get for the volume of steam from a unit of water at any other temperature:—

$$V = \frac{1670 \times 15}{670} \times \frac{458 + t}{P},$$

$$\text{Or, } V = 37\tfrac{1}{3}\ \frac{458 + t}{P}, \quad \ldots\ldots\ldots \text{(2.)}$$

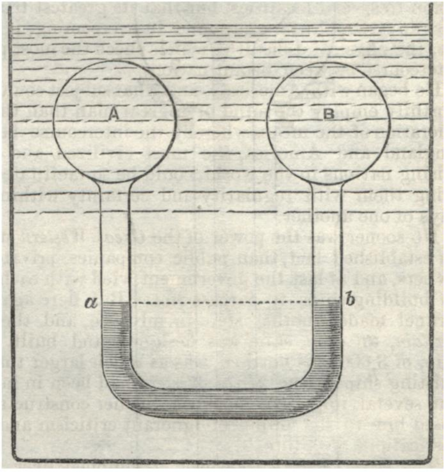
These are the well-known and received formulæ from which all the tables of the density of steam have hitherto been deduced, and on which calculations on the duty of steam-engines have been founded. Up to the present time, however, this formula has never been verified by direct experiment, nor are the methods hitherto employed in determining the density of gases and vapours applicable in this case, except at the boiling temperature of the liquid at the ordinary atmospheric pressure. But, on the other hand, theoretical speculations throw considerable doubt on the accuracy of the above formula when applied to steam and other condensable vapours. Several years ago, Dr. Joule and Professor William Thomson announced, as the result of applying the new dynamical theory of heat to the law of Carnot, that for temperatures above 212° Fahrenheit, there is a very considerable deviation from the gaseous laws in the case of steam. Later, in 1855, Professor Macquorne Rankine has given a new theoretical formula for the density of steam, independent of Gay-Lussac's law, and confirmatory of Professor Thomson's surmise. But as yet these speculations need the evidence and verification of direct experiment.

The density of steam is ascertained by vaporising a known weight of water in a glass globe of known capacity, and noting the exact temperature at which the whole of the water becomes converted into steam. From these three elements,—volume, weight and temperature, —the specific gravity is known. But in pursuing this method, these two difficulties must be overcome. First, the pressure of the steam renders it necessary that the glass globe should be heated in a strong and consequently opaque vessel. Second, as steam rapidly expands in volume for any increase of temperature beyond the temperature of saturation, it would, in any case, be impossible to decide by the eye the temperature at which the whole of the water became vaporised. The temperature of saturation, or temperature at which the whole of the moisture is converted into steam, whilst no part of the steam is superheated, must be determined with the utmost accuracy, or the results are of no value.

The difficulties thus resolve themselves into finding some other test of sufficient accuracy and delicacy to determine the point of saturation. This has been overcome by what may be termed the saturation gauge; and it is in this that the novelty of the present experiments consists.

To illustrate the principles of the saturation gauge, suppose two globes A and B, Fig. 1, connected by a bent tube containing mercury at *a b*, and placed in a bath in which they can be raised to any required temperature. Suppose a Torricellian vacuum to have been created in each globe, and 20 grains of water to have been added to A and 30 or 40 grains to B. Now, suppose the temperature to be slowly and uniformly raised around these globes; the water in each will go on evaporating at each temperature, being filled with steam of a density corresponding to that temperature, and the density being greater as the temperature increases. At last a point will be reached at which the whole of the water in globe A will be converted into steam, and at this point the mercury column will rise at *a* and sink at *b*; this is the saturation test, and the cause of its action will be easily seen. So long as vaporization went on in both A and B, and the temperature was maintained uniform, each globe would contain steam of the same pressure, and the columns of mercury *a*, and *b*, would remain at the same level. But so soon as the water in A had vaporized, and the steam began to superheat, the pressure in A would cease to remain uniform with the pressure in B, and the mercury column would at once fall and thus indicate the difference. The instantaneous change of the position of the mercury is the indication of the point at which the tem-

Fig. 1.

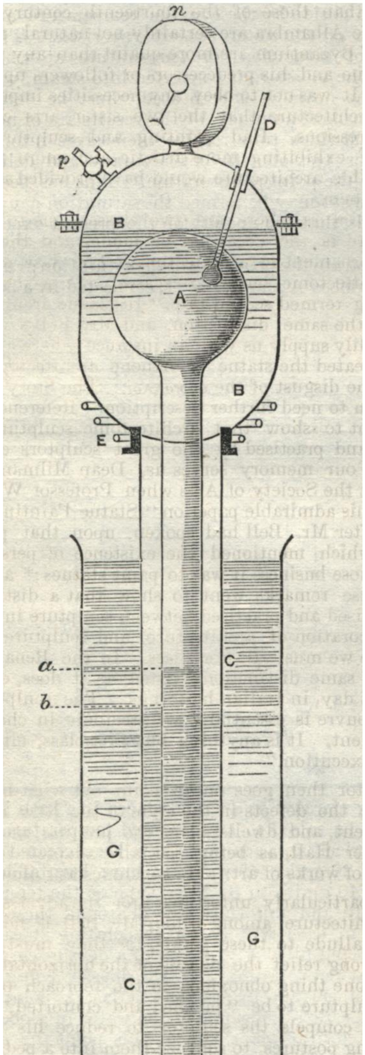


perature in the bath corresponds with the saturation point of the steam in A.

To show the delicacy of this test, I may instance that at 290° Fahrenheit, the mercury column would rise nearly two inches for every degree of temperature above the saturation point, as the increase of pressure arising from vaporization is twelve times that arising from expansion in superheating at that point, and a similar difference exists at other temperatures.

The apparatus, as employed for experiment, varies according to the pressure and other circumstances of its use. Fig. 2 represents one of the arrangements which has been employed with success. It consists of a glass globe of about 70 cubic inches capacity, in which is placed, after a Torricellian vacuum has been formed, the weighed globule of water. The globe with the stem is shown at A; this is surrounded by a copper boiler, B B, prolonged by a stout glass tube C C, enclosing the globe stem. This copper boiler forms the water and steam bath through which the globe is heated, and in fact corresponds to the second globe, B, in the former figure. The fluctuating mercury column, or saturation guage, is placed at the bottom of the tube C C, and the saturation point is indicated by the rise of the inner mercury column *a*, and the fall at the same time of the outer mercury column, *b*. As soon as the whole of the water in the globe A is evaporated, there is an instantaneous rise of the inner mercury column to restore the balance of pressure, and that progressively with the rise of temperature.

Fig. 2.



As an auxiliary apparatus the boiler is provided with gas jets, E, to heat it, and with an open oil bath, G, to retain the glass tubes at the same temperature as the boiler, and this oil bath is placed on a sand bath, and also heated with gas. A thermometer, D, registers the temperature, and a pressure guage, *n*, the pressure of the steam; and a blow off-cock, *p*, serves to reduce the temperature when necessary. A number of results have already been obtained, but they are not yet sufficiently advanced to be made public. The following numbers have been, however, approximately reduced from the theoretical formulæ given above, and the experimental results may illustrate the use of this method of research. The most convenient way of expressing the density of steam is by stating the number of volumes into which the water of which it is composed has expanded. Thus one cubic inch of water expands into 1670 cubic inches of steam at 212° Fah., into 882 cubic inches at 251°, and into 400 cubic inches at 304°, and so on; in this way the following numbers have been computed:—

	Volume of Steam.	
Temperature.	By Formula.	By Experiment.
244°	1,005	896
245°	969	890
257°	790	651
262°	740	680
268°	680	633
270°	660	604
283°	540	490

These determinations at pressures varying from ten to fifty lbs. above the atmosphere, are not accurate reductions from the experimental results, but only approximations. But they uniformly show a decided deviation from the law for perfect gases, and in the direction anticipated by Professor Thomson, the density being uniformly greater than that indicated by the formula. I hope by the time of the next meeting of the Association, with the assistance of my friend Mr. Tate, to be enabled to lay before the section a series of results which will fully determine the value of superheated steam, and its density and volume as compared with pressure at all pressures, varying from that of the atmosphere to 500 lbs. on the square inch.

GOTHIC ARCHITECTURE AND SCULPTURE.

For several weeks past, an interesting discussion has been going on in the columns of the *Building News*, arising out of a letter addressed to the editor of that journal by Mr. John Bell,[*] in which the important question, "Is Gothic architecture in harmony with the highest class of painting and sculpture?" was opened up. Mr. Bell fears not, "at least in its present state, or in any phase which it has as yet taken." He says:—

"As a broad proposition, do not in Gothic architecture the paintings go into the windows, and the sculpture into spaces where they are pinched, and occasionally contorted? And supposing paintings are placed on the walls, are not their harmony and effect liable to be injured, if not destroyed, by the rainbow tints cast by the windows, which we all feel should, in Gothic structures, be all more or less coloured? And if, in the same character of architecture, statues are placed of a scale and treatment, whether poetic or portrait, suitable to the dignity of their subjects, are they not apt to be out of harmony with the structure? I fear that the more the artist has had experience in these matters, the more readily he will be inclined to answer 'yes.'

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[*] See *Building News* for Sept. 9, 1859, p. 810.

"There is, no doubt, a style of painting and a style of sculpture that harmonises admirably with Gothic structures, but of what kind is this? Is this first-rate? By no means. It is second-rate; and is this the style of these arts we want to encourage? I should hope not. All the productions of painting and sculpture, to perfectly harmonise with Gothic architecture, must, I fear, be more or less heraldic. They must be accommodating. The paintings must either be in the windows, and of the jewel-like character of composition suitable for that purpose, or they must, on the walls, be quaint and on gold grounds, &c., and the sculpture must be 'architectonic,' which is pretty nearly another name for stiff and unnatural, at least when Gothic is the architecture. I know there are some few cases which may be brought forward as exceptions. I could name some myself, but still I hold that they are exceptions. I fear sadly that it is too true that Architecture in her Gothic house does not hold out a ready welcome to her sisters Painting and Architecture. It is true that she invites them, and says she will be very glad to see them, but then she says, 'You must behave yourselves. You must do so and so! You must not give way to your natural impulses!' I believe that every word I have said here is backed by the experience of every painter or sculptor who has been engaged in the New Houses of Parliament."

In the following number of the same journal, the editor draws particular attention to Mr. Bell's communication, while expressing dissent from his conclusions. In this article, the "exceptions" to which Mr. Bell alludes are particularly dwelt upon :—

"If there are exceptional instances of Gothic Architecture, in which sculpture is not pinched and contorted, not architectonic and stiff or unnatural, in which painting is not confined to windows, not more or less than heraldic, or quaint, it follows that these exceptional instances may be imitated—we do not say copied—and reproduced again, so that painting and sculpture in Gothic edifices need not be second-rate. What has been done once may be done again, if architects will work as artists and not as artificers. The exceptions prove the elasticity and almost universality of Gothic architecture, which does not consist alone in pointed arches, clustered columns, and floral ornaments, but in its useful and practical character, in its constructional truth, and in the broad measure which it accords to all who practise the style. The purpose of Gothic architecture is to satisfy the requirements of man, and not to curtail nor stint those requirements in obedience to imagined rules, which are at the best empirical, which are lost amid the hazy traditions of antiquity, and whose reason for being exists only in the crazes of self-styled geometricians. Surely nothing can be more ridiculous than the pretended discoveries of these same geometricians of fancied reasons for the proportions of classic architecture. The parade of a belief in the mystic properties of numbers—the resuscitation of an old figment—is worthy of the worst period of the middle ages. To tell us that our columns must be of this diameter, of that altitude, or have that space between them, without reference to the character of the building materials available, is to make us the slaves of a senseless mysticism, and to bind art in fetters. None but the ignorant believe there is luck in odd numbers, and we have gone too far-a-head in arithmetic to believe in the mystic properties of numbers.

* * * * *

"If in the majority of Gothic edifices erected during the middle ages, the paintings and sculpture they contained were quaint and stiff, are we justified in believing that these defects were due solely or even principally to the style of the building? We believe not, and imagine that Mr. Bell will concur with us in this opinion, when he calls to mind the character of both painting and sculpture, until the Revival. The defects of which complaint is made, and unfairly imputed to Gothic architecture, arose from the ignorance of painters and sculptors, and they will be found quite as absurd, if not worse, in the works of artists who flourished in pre-Gothic periods. Take the statues of the Romane or Romanesque, and they will be found more pinched and distorted than those of the fourteenth century. The lions in the Alhambra are certainly not natural, and the pictures of Byzantium are more quaint than any painted by Cimabue and his predecessors or followers up to the Revival. It was not to obey any necessities imposed by Gothic architecture that the two sister arts crippled their expressions. Had painting and sculpture been capable of exhibiting more artistic and more natural forms, Gothic architecture would have provided a fitting home for them.

"Of sculpture there are two classes, one to which architecture is the encasing or home, and the other which is ornament to architecture. The last may be called architectonic, but we are scarcely prepared to agree in its being termed second-rate. In classic architecture there was the same distinction, and Mr. Bell's reading would readily supply us with an instance where a Greek sculptor treated the statue of Athene architectonically, much to the disgust of the οι πολλοι. The Story is too well known to need further description. Reference will be sufficient to show that architectonic sculpture was known to and practised by the great sculptors of antiquity. If our memory serves us, Dean Milman, who presided at the Society of Arts when Professor Westmacott read his admirable paper on "Statue Painting," remarked, after Mr. Bell had spoken, upon that passage of Plato which mentioned the existence of persons in Athens whose business it was to paint statues;[*] and the drift of these remarks went to show that a distinction was recognised and practised between sculpture intended for the decoration of architecture, and sculpture which we suppose we must call first-class. In the Renaissance period the same distinction existed, as it does, even at the present day, in Italian buildings. The sculpture of the new Louvre is essentially architectonic in character and treatment. It is anything but first-class, either in design or execution."

The editor then goes on to point out what he considers to be the defects in the style of the New Houses of Parliament, and dwells upon the peculiar merits of Westminster Hall, as being specially adapted for the exhibition of works of art. He concludes as follows :—

"It is particularly unfortunate for the adversaries of Gothic architecture, among whom Mr. Bell is not to be classed, to allude to these points, for they must bring out into strong relief the defects of the horizontal style. If there is one thing obnoxious to the reproach of condeming sculpture to be "pinched and contorted," it is that which compels ths sculptor to reduce his figures into stooping postures, to squeeze them into a pediment. Architecture is not a "niggard and martinet" in her Gothic house, for there she makes the painter or sculptor a chartered libertine, leaving him free to follow his inspirations, and independent of the fetters of routine, precedent, and geometrical crazes. If she has been so hitherto, what will she not be hereafter, when she has more fully entered into the phase, on the threshold whereof she now stands, to adapt herself to the civilisation of the nineteenth century, and to satisfy the requirements of the age? Let an opportunity be afforded; let any one of our Victorian Gothic architects be asked to design a building which shall encourage the highest efforts of painting and sculpture, and an edifice will be the result, which, we feel confident, Mr. Bell will admit, welcomes, like a Lady Bountiful, the highest efforts of the sister arts, with greater readiness and freedom than do the Classic and Italian styles."

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[*] See present Vol. of *Journal*, p. 233.

The subject thus thoroughly opened up has produced many communications to the editor of the above-mentioned journal, some in opposition to Mr. Bell's views, and others in support of them. The arguments adduced on both sides tend to show that the right conclusion depends very much on the question how far Gothic architecture can be adapted to the requirements of high-class sculpture, for most of the writers acknowledge the shortcomings of the Gothic style in this respect, as shown by the "examples of the past."

The subject is one of much interest, and the whole discussion, which necessarily involves considerable detail, is well worthy of perusal.

Home Correspondence.

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MERCANTILE STEAM TRANSPORT ECONOMY.

Sir,—I shall be obliged by your noticing the following *errata* which occur in the *Society of Arts Journal* of 14th inst.:—

Page 726, col. 1, line 21—for 112·10 read 11,210.
,, ,, 2 ,, 34—for each ind. read each 10 ind.
Page 727, Table D, seventh col., line 27 for 448 read 248
,, Heading of third division—for 25 knots read 20 knots.

I am, &c.,
CHAS. ATHERTON.

Woolwich Dockyard, 25th Oct., 1859.

STEAM TOWAGE ON CANALS.

Sir,—In your *Journal* of the 30th ult. is an article describing an invention, by Mr. W. Robertson, of Strangeways, Manchester, for the traction of barges on canals, and an experiment said to have been made on the Bridgewater Canal. The paragraph states that various attempts have been made to employ upon canals steam-tugs, propelled by paddles or screws, in place of traction by horses, and says the objection against them is always the same—that the waves created by the propelling surfaces injure the banks, &c. It then proceeds to describe the invention, and concludes by saying that the experiments proved highly satisfactory.

In the first place, the experiment can hardly be considered satisfactory when there is a loss of 25 per cent. in drawing an empty canal-boat; but the chief objection is that the difficulty of steam traction for canals is not fairly stated. That the waves created by the propelling surfaces injure the banks, when the screw is used, is simply untrue. The injury to the banks is caused by the increased speed of the vessels, which, in a narrow canal, lowers the water when each boat is passing about eighteen inches, and the sudden return of this does the injury complained of. When the speed is less than four miles an hour it is not observable, but beyond this the injurious effect is very apparent, without any perceptible wave from the action of the screw.

Some years since an experiment was made on the canal between Wigan and Liverpool, in the presence of several of the directors of the canal and large coal-owners who wished to economise the carriage of coals. A long, narrow screw-steamer was employed, and it drew a long train of laden coal-barges, diminishing the number at intervals. It was found that, whilst the amount of load made comparatively little difference in the power of traction, the injury to the banks was solely caused by the rate of speed, which it was not safe to increase beyond a horse's walk. Nothing, therefore, was to be gained in speed, and even if the employment of a steam-tug to draw a long train of barges were less costly than the employment of horses, there still remained the difficulty of passing the locks, which would prove so serious a diminution from the saving on level water that the attempt was abandoned.

There is nothing in the account of the experiments on the Bridgewater Canal which shows that either of the difficulties I have alluded to has been overcome, or even so great an advantage gained as that by the screw-steamer.—I am, &c., BARNETT BLAKE.

Leeds, Oct. 11, 1859.

SAWDUST AND CRACKED BELLS.

Sir,—In the *Journal* of Sept. 9th, Mr. J. W. Carlile calls attention to the large quantity of sawdust and wood-cuttings wasted or burned without effective purpose.

This is an important subject, when we consider the enormous heaps of sawdust found near timber-works, in Europe and America, the danger from fire if they are left near the mills, the expense of carting them to a distance, the valuable space they occupy, the destruction of fish caused by casting the sawdust into the rivers, and the trouble of burning this material to avoid these disadvantages.

I was much struck with this when passing through Sweden last week; and it occurs to me that it may be well to mention that I saw a boiler-furnace burning crude sawdust, entirely unprepared and unmixed, in successful operation last summer, at St. John's, New Brunswick. I do not recollect exactly the construction of this furnace, but I think that Mr. J. Robinson, the proprietor of the extensive saw-mills where it is used, would gladly send a description to any person who may apply for it.

In the matter of the broken bell at Westminster, perhaps we might possibly learn from the Russians what is to be done in making a better job of the next casting. Every person knows how celebrated Russia is for the size, the tone, and the numbers of its church bells.

Some weeks ago I was at Kimra, a small town on the Volga, in the centre of Russia. Part of the church tower had been lately consumed by fire, and the bell had fallen from a height of 50 feet, and embedded its edge about two feet in the stone pavement below.

This bell weighs more than 16 tons, that is, it is two tons heavier than the Westminster bell, yet it survived this fall, and is still sound, without even a crack. Let us bring this bell to London, and let it toll the time until the clockmakers settle their squabbles, and a better Big Ben is cast. I am, &c.,

J. MACGREGOR.

Temple.

CARBON GAS FIRE.

Sir,—Several patents have been taken out for gas fires in open grates, the patent being for the material used, such as "pumice," "asbestos," the material called the "polytechnic fire," "lump asbestos," and other materials, the use of which is very limited in consequence of the expense. The "lump asbestos" is valued at a guinea a pound, and the "polytechnic fire" material, although not so expensive in itself, requires more gas to get up a red heat; it also becomes very brittle by use, so that when taken out of the grate to clean the gas pipes—the holes requiring broaching occasionally—it breaks in pieces, destroying the effect intended. Finding this to be the case, and yet anxious to introduce gas fires, I have been trying experiments with material of various kinds, and have succeeded in producing a gas fire, superior, I believe, to any yet introduced. I have taken out no patent for it, that all gas companies whose interest it is to introduce gas fires to the public may do so at the cheapest possible rate. The material I find best suited for use is the carbon removed by the process called scruffing, from gas retorts; it should be broken up in lumps of about 2½ or 3 inches, and piled in the grate by hand, not thrown on in a mass. I find this material absorbs the gas, and causes a perfect combustion, making an excellent fire and throwing out a great heat, with a less consumption of gas than any other material. Gas companies can sell the carbon at 2s. 6d. per bushel ready broken, so that the cost of material will be trifling—one bushel lasting from three to six months, according to the heat required.—I am, &c., MAGNUS OHREN.

Gas Works, Sydenham, September, 1859.

Proceedings of Institutions.

Halifax Mechanics' Institution.—On Saturday evening, the 15th October, a soirée was held in connection with the Halifax Mechanics' Institution, on the occasion of distributing the prizes awarded to its members by the Society of Arts. The Chair was taken by the Right Hon. Lord Brougham, who was accompanied by the Earl of Shaftesbury, the Hon. A. Kinnaird, Mr. Frank Crossley, M.P., Mr. Edward Baines, M.P., the Mayor, Mr. J. S. Walsh, Archdeacon Musgrave, Mr. John Whitworth, president of the Institution, Mr. John Crossley, Mr. Joseph Crossley, Mr. James Stansfeld, Mr. W. H. Ripley (Bradford), Mr. S. Smith (Bradford), Mr. S. Waterhouse, Mr. Rankin, Mr. James Bowman, Professor Pillans (Glasgow), Mr. C. W. Sikes, (Huddersfield), the originator of the Penny Savings Banks, &c. The Chairman called upon Mr. James Stansfeld, one of the vice-presidents, who presented a report of the present position of the Institution. The total number of members on the books, it stated, was 732, of whom 205 were subscribers under eighteen years of age, and 90 female subscribers. The younger members for the most part were receiving instruction in the class-room. The average attendance of the male pupils at the classes was 171, and of the female 56. For the younger portion of the members there was a library of 1,000 volumes, and for the general members one of 4,000 volumes. The directors of the Institution had not been able, in consequence of the financial position, to purchase new books, although they felt that these additions must be continually made if the interest in the library was to be sustained. Occasional lectures had been given during the year, but they have only been occasional, for at Halifax this mode of receiving instruction appeared to have ceased to be attractive. The report briefly mentioned the position of the other departments of the Institution, and especially referred to the extraordinary success of the Penny Savings Bank. This was only established in 1856, and at the present time there were upwards of 3,000 depositors with open accounts, the average deposits of each being 3s. 10¾d. per week. The results of the examination of those from the Institution who submitted themselves to the Society of Arts' Examination the committee regarded as evidence of the solid character of the instruction afforded. Although the prizes were few, they were of a high order, and the candidates from the Halifax Institute had always attained a high position at these examinations. In conclusion, the directors appealed to their friends to assist them in carrying on their work with increased vigour and efficiency.—The Chairman then rose to address the assembly, and was enthusiastically received. After the applause, his lordship said he hoped it would be quite unnecessary for him to express his high gratification at the reception which they had given him, and which indeed had been extended to him by his Yorkshire friends wherever he had gone; and continued by alluding to the intense pleasure he had derived from visiting the marvellous works of his friend Mr. Frank Crossley, and the beautiful park so munificently presented by that gentleman to Halifax. Anything more splendid, anything more beautiful, and, what was better than splendour or beauty, anything more useful for innocent relaxation and wholesome enjoyment, anything more perfectly adapted to its purpose, than that park, he had never seen; and he was sure that with such a park open to them, no one need envy any proprietor of land in the country his grounds and gardens. Going on from better to best, he had derived a still higher enjoyment and gratification on learning from the report of the success of their Institution; and upon one or two points he would say a few words. The first point which had given him gratification was the great number of the working classes who profited by the Institution, three-fifths of the members belonging to that body. That was not all; he found that lessons were given adapted to the circumstances of the people, and he particularly noticed that sewing was taught. There could not be a better thing than to teach girls sewing, not excluding other teaching, such as a little history and geography, and even a little French—but the great thing was to teach women first that by which they might be made good housewives, good mothers of families, good wives of working men, so that they might make the working man's home more comfortable than the alehouse. This training was too much neglected in all institutions of this kind, and he had often complained of it, but that which was done here set an example to other places. He had been gratified to find that three-fifths of their members were working men, but he did not think that 700 or 800 was a sufficient number from the population of Halifax. Without offering any word of complaint he was most anxious that there should be more, and he would take the liberty of repeating the advice he had given at Bradford, that they should appoint a committee of working men from the members of the Institution, to canvass their brethren to unite with them in this good work—great and good for themselves, great and good for society, because society benefited by whatever benefited the individual — but he would have them to prosecute this canvass chiefly on the ground that it would be for their own personal advantage if they became members of the Institution. The thing, however, which above all had gratified him was the reference to Penny Savings Banks. There could not be a more useful institution. What they did was not so much to teach people providence as to encourage habits of providence, and he thought that 3,000 depositors was a very large number in proportion to a population of 40,000. His lordship concluded by thanking them for the patience with which they had heard him.—Mr. E. Baines, M.P., on rising to submit the first sentiment, referred to the admirable adaptation of their building for the purposes of a Mechanics' Institution, told them of what was being done by the Society of Arts, and directed their attention to the Yorkshire Union, hinting that that Union might shortly pay them a visit, and urging them to fill their class-rooms with pupils. They had heard from the report that lectures had ceased to be attractive in Halifax. Now he ventured to say to the committee that though lectures had for a time ceased to be attractive, they might become attractive again. Lectures had a value. They might be relied upon too much, and there were, no doubt, institutions which had drawn the most distinguished persons from all parts of the country, until the audiences had become satiated; but whether this was the case here or not, he ventured to predict that a series of good lectures would undoubtedly draw respectable audiences. It was at a lecture, given by Dr. Birkbeck in 1824, at which Lord Brougham was present, that he first received his knowledge of Mechanics' Institutions, his sense of their value, and his firm determination to do all he could to promote them. He was exceedingly glad to find that not only were their class-rooms finished, but that they were well filled. Classes were the oldest as well as the newest feature of these institutions,—for Dr. Birkbeck taught a class of working men in Glasgow twenty years before the lecture he had referred to,—and they were also the most important. The sentiment he had to submit to the meeting was "Mechanics' Institutions, in connection with Popular Education." He was sure he should have the concurrence of the noble chairman in saying that the classes—where they had systematic instruction and persevering mental application—were the most important part of a Mechanics' Institution in their relation to popular education.—The President then proceeded to deliver the prizes and certificates awarded by the Society of Arts.—The Earl of Shaftesbury received a most cordial and enthusiastic welcome. After mentioning his visit to Halifax two years ago, on the occasion of the opening of the People's Park, and referring in terms of eulogy and admiration to the great munificence and generosity of Mr. F. Crossley, his lordship remarked that wherever he went in Yorkshire he found Mechanics' Institutions in great abundance and in very great prosperity, and he rejoiced in this prosperity, because its results were so beneficial. He would plead guilty to having, some years ago—before he was aware of the necessity and operation of such institutions—of the principles which governed them and the objects to which they were directed—looked at them with the greatest possible alarm. The longer he lived, however, and the more conversant he became with the working and objects of these institutes, the more convinced was he of their absolute necessity as great means of education —for maintaining education already acquired, and for acquiring it when not obtained in early years. He said, therefore, "God speed Mechanics' Institutions." He was pleased to hear the practical character of the report read at an early period of the meeting. He was glad to see that they had formed a class for women, which, he believed, was peculiar to that Institution. It was a matter of vital importance that more attention should be paid to the education of females, which had been lamentably overlooked. In addition to sewing, he saw no reason why they should not be taught knitting, cooking, washing, and everything which would make a good wife. Thus, the home of the working man would be rendered peaceful, comfortable, and attractive. With reference to penny banks, he regarded them as the great discovery of modern times, judging by the effects they produced on the habits and morals of large masses of mankind. His lordship then referred to the great gratification which he had received from his visit to Yorkshire, especially in observing the mutual feeling of confidence and respect which existed between all classes. Often and often, when engaged in the effort to secure the reduction of the hours of factory labour, he had heard the people in Lancashire and Yorkshire say, that if that question were once settled they would never again give any annoyance to the Government. They never had, and he would undertake to say that in no part of her Majesty's dominions were there so much security, so much peace, so much safety, so much loyalty, and so much good affection to the Government under which they lived, as in the great counties of York and Lancaster. It was a source of unfeigned delight to see the mutual good relations between employer and employed, and to hear their reciprocity of kindness. When he went amongst the operatives, he was delighted to hear their kind expressions towards those by whom they were employed,—when he went amongst the masters he was equally delighted with their feelings towards the men; and all agreed that the adoption of the measure to which he had previously referred had done great good to the men and had done no harm whatever to the masters. This was a state of things in which every Englishman should rejoice, and in which every patriot must feel assured. They were told that "a nation divided against itself cannot stand;" but let them also equally believe that other truth, that a people of one and the same heart, by the blessing of God, shall never fall.—Mr. John Whitworth then made a statement of the financial position of the Institution, with the view of suggesting a plan for extinguishing the debt. The erection of the hall of the Institute, with interest, had cost something like £8,700. There still remained a debt upon the building fund, with accumulated interest, £1,700.—Mr. F. Crossley, on rising, was loudly cheered. The two noble lords, he said, had spoken of him in a far too flattering manner, but he felt that they had not uttered merely empty compliment, and he thanked them from the bottom of his heart. He then referred to the efforts of Lord Brougham for the abolition of slavery, and other philanthropic objects. Passing to the subject of the Institution, he said that all who were willing might there receive a good English education. Its doors were open and accessible to all, and those who availed themselves of these advantages were the men who would succeed in after life, for they might depend upon it that employers had their eyes open, and were looking out for the most intelligent and best instructed of their workmen to place them in positions of trust and responsibility. Where were they to find them, except amongst youths such as those who had received the rewards that evening. Lord Brougham had said the other night that thinkers must govern workers. So it must be, and it was very well for those who worked that there were thinkers who directed their sinews, and it was necessary for thinkers that they should have workers to carry out their thoughts and give them practical effect. The hon. gentleman then referred to the debt upon the Institution, and the necessity for its liquidation. When an effort to extinguish the debt was previously made, he promised £500 on condition that it was paid off in 1861, and two of his brothers each promised a similar sum. The panic, however, which set in in 1857, prevented the total extinction of the debt, but such was his anxiety that this consummation should be attained, that he was disposed to increase the £500 to £800, provided the debt was paid off by the time originally fixed. In conclusion, Mr. Crossley gave "Success to the Social Science Association."—The Hon. A. Kinnaird, in supporting the proposition, referred to the important objects which the Social Science Association sought to accomplish.—Mr. Ripley having briefly returned thanks on behalf of the Asoociation, Messrs. John and Joseph Crossley expressed their intention of following the example of Mr. F. Crossley, by adding £300 each to their original contributions.—Subscriptions were then handed in from various parts of the room, the total sum contributed being £1,570. In addition to the sums already mentioned, Mr. John Whitworth subscribed £200, Sir C. Wood, £100; Mr. Jas. Stansfield, £40; Mr. J. Stansfeld, jun., M.P., £20; Mr. H. W. Ripley, £25; and Mr. J. J. Coleman, £3, the amount which had been awarded to him as a prize.—Mr. Philbrick moved a vote of thanks to the ladies, who had presided at tea, and the resolution was carried by acclamation.—Mr. John Crossley proposed, and Mr. Stansfield seconded, a vote of thanks to Lord Brougham, the Earl of Shaftesbury, and the other distinguished visitors who had attended the meeting.—The motion having been carried amidst loud cheering, Lord Brougham returned thanks, and referred to his long connection with Yorkshire, which he dated from the year 1808, when he represented several Yorkshire towns, as their counsel, in their endeavour to get rid of the Orders in Council. The meeting then separated.

Halifax.—(Haley-hill Working Man's College.) The distribution of the certificates gained by the students at the last examination of the Society of Arts, took place on Tuesday evening, October 11th, in the large school-room, Haley-hill, on which occasion there was a very numerous and respectable audience. The chair was taken by Mr. E. Akroyd, Principal; and amongst those present were Mr. T. S. Walsh, Mayor, Vice-Chancellor Sir W. Page Wood, the Right Hon. C. B. Adderley, M.P., Sir J. K. Shuttleworth, Bart., Sir

Thomas Phillips, Chairman of the Council of the Society of Arts; Major Edwards, M.P., Professor Pillans, Glasgow; Mr. J. Waterhouse, Mr. T. D. Ackland, Suffolk; Mr. Charles Ratcliff, Birmingham; Rev. J. H. Gooch, Rev. W. H. Wawn, Mr. W. Atkinson, &c. The choir of All Souls' Church were in attendance, and sang some pieces during the evening.—The CHAIRMAN said they were invited to take part in and witness the interesting proceedings connected with the distribution of the certificates of merit from the Society of Arts, to the successful competitors amongst the students of the Haley-hill Working Man's College. Amongst those invited to be present on that occasion were several distinguished guests, some of whom would address them on the subject of education. Those distinguished guests had done him and them the honour of being present, had a world-wide fame for their efforts in advancing the progress of education, and had shown, by deeds as well as words, the interest they took in promoting the welfare of the working classes. He was particularly anxious that those gentlemen should be with them on that occasion, because, as he would venture to say, that Institution was what it professed to be—a college of working men; and much to their honour it was that those men, who, after spending many hours in daily toil, should, when night approached, instead of indulging in sensual and debasing enjoyments, exercise their faculties and energies in opening new fields of knowledge, and devote themselves, heart and soul, to the work of raising themselves in the scale of civilisation and of society. They commenced education where the factory system let it off, and he ventured to say that one cause of the great success of Mechanics' Institutions in Yorkshire and Lancashire was, that the superstructure was based on the education provided by the Factory Act. When they dealt with those who had mastered the rudiments of education, they could advance much beyond what could be accomplished in other parts of the country. Hence, the success of Mechanics' Institutions in Yorkshire and Lancashire and their failure in London and elsewhere. The certificates of the Society of Arts had a general value, not like "penny tokens" which only passed current in particular neighbourhoods, but were like the coin of the realm; and wherever any student presented one of those certificates he would find they bore a general value, and that intelligent employers would give the preference to young men with such testimonies of their qualifications. It was evident, therefore, that the Society of Arts was conferring great benefits on the community by directing its attention to this matter—combining central control and examination with local management. They had thereby, what seemed to him a perfect machinery for advancing the progress of education, and promoting the interests of those who obtained certificates of general value throughout the kingdom. He might mention one instance of this in the fact that one of the collegians who obtained a certificate in chemistry had recently got a situation in the north of England with a handsome salary, simply from the circumstance of having gained that certificate. He had now the pleasing duty of presenting certificates to the successful students of the college, fourteen in number, who had gained them in one year, and as the principal of the college, he tendered those students his hearty thanks for their meritorious conduct, showing as it did that his endeavours to promote the prosperity of the Institution had not been in vain, and that whilst they had improved themselves, they had increased the credit and character of the college. The Principal then distributed the certificates to the successful students.—The Rev. J. H. GOOCH moved the first resolution:—"That this meeting desires to express its entire confidence in the manner in which the examinations of the Society of Arts are conducted, and to express the hope that all Institutions professing to aid adult education of the people will, by means of Local Boards, avail themselves of the great advantages resulting from such examinations."—Mr. CHARLES RATCLIFF, Birmingham, briefly seconded the motion, observing that from the little knowledge he had of the way in which the examinations of the Society of Arts were conducted, he was persuaded that in this, and all districts where the Society exercised its influence, it would be followed with the best effects.—Sir THOMAS PHILLIPS, chairman of the Council of the Society of Arts, next addressed the meeting, and after acknowledging the resolution just passed, observed that some might ask what direct connection the Society of Arts had with Mechanics' Institutions and the system of adult education throughout the land. Most of them were aware that the Society of Arts was instituted for the encouragement of Arts, Manufactures, and Commerce, and it had come to the conclusion that one important means of promoting arts, manufactures, and commerce was by the education of the working-classes of the country. For many years an endeavour had been made, by means of adult instruction in Mechanics' Institutions and Working Men's Colleges, to assist those desirous of improving their education; but those efforts were very desultory, and wanted that systematic character which would give value to their studies. What was wanted was to give students some object which would stimulate them, and cause them to manifest the qualities they possessed for engaging in the duties of active life, and the system now introduced was gradually established. The elevation of the working classes was to him an object of deep interest. By elevation of the working classes he meant far less a change of their condition than that moral standard of conduct, the restraint and self-government which might be learned in the progress of study at the college, and which it was well calculated to insure. Elevation of character was not dependent upon condition of life, but was to be found in the cottages of the poor as well as in the mansions of the rich. He did not undervalue the struggle to improve the condition of life, but with the struggle to rise and advance, unless there were that moral elevation of character, that self-respect, that recognition of duty to their neighbours and themselves,—unless those qualities went hand in hand with the intellectual culture, the intellectual culture itself would be in great danger, for it was a power which might be productive of evil as well as good. He had great confidence in lads who worked by day and studied by night, and who sacrificed present gratification for the sake of future well-being. He could not help expressing a wish to those who got rewards not to become proud, and that those who failed might be equal to the deserts of those who succeeded. It was a valuable distinction to receive the rewards, and he hoped they would prove a stimulus to future exertions.—Vice-Chancellor Sir W. PAGE WOOD said he felt some embarrassment in addressing them, but he was one of those who took a deep interest in such meetings as that, and the objects they had in view. They did not meet to speak words of flattery; but he honestly stated that he had long wished to see Mr. Akroyd and the working of the system he had adopted with such success; and it was very gratifying to him to witness, not only such an appreciation of his labours, but the results which, with that gentleman's assistance and co-operation, they had produced. That they might continue those exertions to their life's-end was his earnest wish. He had great faith in examinations, without which they could not test the fruits of education. He had to tell them of the failure of a Mechanics' Institution in a district of London. For eighteen years they had endeavoured to protract its existence, and the great reason of its failure was that they had no means of stimulating its members to active exertion by means of those examinations which had been carried on through the operations of the Society of Arts. After struggling for eighteen years in vain to carry on that Institution, they were obliged to give up all their exertions; and the only comfort was that it led to success in another step, that of establishing a free library under Mr. Ewart's act, and that was the only free library established in the metropolis. Let them not forget that all they had done at present was merely the means towards an end—that their end was the advancement of their condition, not merely as regarded pecuniary or social advancement in the ordinary sense of the term, which he did not despise, for he had been a hard-working man all through life—but he recommended them to regard these as means to a great end, not merely that of improving their intellectual but moral being; not only of their knowledge of duty to their fellow men, but of an acquaintance not only in word but in deed, with the duties they owed to their Creator.—Sir J. K. Shuttleworth moved the next resolution, "That working men's colleges and mechanics' institutions are insufficient, in an educational point of view, unless they have connected with them a complete system of class instruction for young men and women, conducted by qualified teachers." He observed that ever since he became acquainted with the college established in Halifax, he had pleasure in recognising in it an example which ought to be influential in a great part of Yorkshire, and which had been in a great part of Lancashire, with respect to class instruction. The system of Mechanics' Institutions with regard to instruction by high scientific lectures had failed. The speaker then enlarged on the importance of systematic teaching, and concluded by saying that he regarded these Institutions as a means of solving some of the great difficulties which beset our complicated system. He believed that everything they had done for the enlightenment of the masses, would increase the security of property, and that every day as the working men increased in intelligence they drew the relations of labour to capital closer and closer. Mr. T. D. Acland, Vice President of the Society of Arts, seconded the motion, and referred to the necessity of educational efforts on behalf of those connected with agriculture.—The Right Hon. C. B. Adderley, M.P., moved the following resolution:—"That Institutions, formed on the plan of Working Men's Colleges, embracing library, reading-room, news-room, recreation-ground, and other means of social amusement, as well as a regular system of class instruction bearing on the occupations and handicraft trades of the students, are deserving of the confidence and support of the working classes." He came there chiefly to study the Institutions with which this part of England was so honourably distinguished. He came to learn, and he should certainly carry away more information than he brought with him. He had had to do with questions like that of the Reform Bill, and the great difficulty was to find a moral qualification, but no such qualification could be found. But in this Institution was to be found the test of the moral character of every one belonging to it. He could only wish them every possible success in that spirit of self-reliance in which they were carrying out their Institution, for he saw in the report that the students had a direct voice in the management of the college. That was the true spirit; let them not look for government patronage, though government might help them with training masters; he was more pleased to see the prizes offered by the Society of Arts than by the minister of state.—Mr. G. H. Bohn briefly seconded the resolution.—The Mayor having taken the chair, proposed a vote of thanks to Mr. Akroyd. Major Edwards, M.P., seconded the motion, which was carried by acclamation.—Mr. Akroyd then acknowledged the compliment, and the meeting separated after singing the National Anthem.

MEETINGS FOR THE ENSUING WEEK.

Wed. ......Geological, 8. 1. Rev. W. S. Symonds, "On the Passage-beds between the Upper Silurian into the Old Red Sandstone, at Ledbury, Herefordshire." 2. Mr. Henry Weekes, "On the Coal Formation, at Auckland, New Zealand." 3. Mr. W. Banerman, "On the Geology of Vanconver's Island."

Thurs. ...Chemical, 8. Prof. Bloxam, "On Crystalline Hydrates of Baryta and Strontia."

PATENT LAW AMENDMENT ACT.

APPLICATION FOR PATENTS AND PROTECTION ALLOWED,

[*From Gazette, October* 21*st*, 1859.]

Dated 30*th August*, 1859.

1973. T. Eastman, Southsea, Hants—Imp. in screw propellers. (A com.)

Dated 1*st October*, 1859.

2225. S. Ward, 8, Stanley-place, Stanley-street, Pimlico—An apparatus to be used in the hardening of saws and steel plates generally.
2227, C. Brown, Warwick-street, Pimlico—Imp. in inkstands and date indicator.

Dated 4*th October*, 1859.

2249. J. Rawlings, Carlton hill East, Middlesex—An improved construction of boot-tree.

Dated 6*th October*, 1859.

2271. G. A. Smith, Old Cavendish street, Middlesex—Imp. in shot and shells, and other projectiles.
2273. W. Hopkins, Birmingham—A new or improved steam engine.
2275. G. Freeman and J. Royle, Unsworth, near Bury, Lancashire—Imp. in looms.
2277. W. Macfarlane, Glasgow—Imp. in machinery or apparatus for drawing off or discharging liquids, and in fountains, baths, and similar receptacles for liquids.
2279. W. Benson, Fourstones, near Hexham, Northumberland—Imp. in projectiles for muzzle loading rifled ordnance.
2281. W. Barron, Elveston, Derbyshire—Imp. in boilers applicable to heating and steam generating purposes.
2283. W. E. Newton, 66, Chancery lane—Imp. in the construction and manufacture of casks, barrels, and such like vessels, and in the machinery or apparatus to be employed for such manufacture. (A com.)

Dated 7*th October*, 1859.

2285. G. L. Lee, 49, Holborn hill—Imp. in producing printing surfaces.
2287. G. P. Dodge, 44, St. Paul's Churchyard—Imp. in apparatus for preserving life, applicable to garments. (A com.)
2289. D. McCallum, Plymouth—Imp. in electric telegraphs.

Dated 8*th October*, 1859.

2291. W. Irlam, Newton Heath, Manchester—Imp. in the construction of railway turntables and cranes.
2293. J. Brough, Birmingham—An improved waterproof dress for protecting and saving life at sea or in other situations where a waterproof dress may be required, as also in the apparatus to be attached to or used with the same, for assisting the wearer to hoist or make signals, by night or by day, and to inflate, propel, and guide or direct himself as desired, the waterproofing principle of which being also applicable to other useful purposes.
2295. J. Childs, Windsor-house, Putney, Surrey—Imp. in the manufacture of artificial gums.

WEEKLY LIST OF PATENTS SEALED.

[*From Gazette, October* 21*st*, 1859.]

October 19*th*.

994. J. M. Johnson and E. Johnson.
1002. J. Napier.
1005. D. Auld.
1007. E. Lewthwaite and G. Ambler.
1010. T. S. Truss.
1018. J. Angus.
1025. J. Marshall, junr.
1030. J. Higgin.
1044. W. Mackenzie.
1048. R. A. Brooman.
1055. H. R. Fanshawe.

Patents on which the Stamp Duty of £50 has been Paid.

[*From Gazette, October* 21*st*, 1859.]

Oetober 17*th*.

2442. R. H. Collyer, M.D.

October 18*th*.

2462. H. Deacon.

October 19*th*.

2474. G. Thomson.
2476. W. E. Newton.
2504. L. A. Mangin.

[*From Gazette, October* 25*th*, 1859.]

October 21*st*.

2480. G. Ermen.

Patent on which the Stamp Duty of £100 has been paid.

[*From Gazette, October* 21*st*, 1859.]

October 17*th*.

450. G. Heyes.
464. J. Gilbert and S. Nye.

October 18*th*.

725. J. F. Belleville.

[*From Gazette, October* 25*th*, 1859.]

October 21*st*.

655. R. B. Cousens.